

Handbook of the
**Psychology
of Aging**

Third Edition

Edited by

James E. Birren

K. Warner Schaie



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Handbook of
The Psychology of Aging

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The Psychology of Aging
Third Edition

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Contents

Contributors	xi
Foreword	xv
Preface	xvii

Part One Theory and Measurement in the Psychology of Aging

1. The Concepts, Models, and History of the Psychology of Aging	
<i>James E. Birren and Betty A. Birren</i>	
I. Introduction	3
II. Intellectual Roots of the Psychology of Aging	4
III. The Relations of General and Experimental Psychology to the Psychology of Aging	5
IV. The Emergence of Developmental Psychology	6
V. Perspectives on Developmental Psychology	8
VI. The Emergence of a Psychology of Aging	10
VII. Complexity and Theories of Aging	12
VIII. The Status of Theory and Explanations of Aging	13
IX. Integrative Theory	15
X. Conclusion	17
References	18
2. Latent Variable Growth Models for Research on Aging	
<i>J. J. McArdle and Edward Anderson</i>	
I. Introduction	21
II. Methods for Latent Growth Model Analyses	24
III. Results of Latent Growth Models	29
IV. Discussion of Latent Growth Models	37
References	40
3. Concepts of Time and Aging in Science	
<i>Johannes J. F. Schroots and James E. Birren</i>	
I. Physical Time	45
II. Biological Time	46

III. Psychological Time 49
IV. Intrinsic Time 54
References 59

Part Two
Influences of Behavior and Aging

4. Human Behavioral Genetics of Aging
Robert Plomin and Gerald E. McClearn
I. Introduction 67
II. Lessons from Recent History 68
III. Developmental Behavioral Genetics 69
IV. The Genetics of Behavioral Aging 71
V. Summary 75
References 77

5. Biological and Health Influences on Behavior
Merrill F. Elias, Jeffrey W. Elias, and Penelope K. Elias
I. Biology, Disease, and Aging 80
II. Methodological Implications of Health Psychology Paradigms 82
III. Methodological Challenges 85
IV. Effects of Health on Behavior 88
V. The Impact of Behavior on Health 94
VI. Health-Related Behaviors and Interventions 96
VII. Conclusions 97
References 98

6. Cultural, Racial, and Ethnic Minority Influences on Aging
James S. Jackson, Toni C. Antonucci, and Rose C. Gibson
I. Overview 103
II. Biological, Social, and Psychological Processes in the Aging of Racial and Ethnic Minorities 106
III. Biological and Health Processes in the Aging of Racial and Ethnic Minorities 106
IV. Social Processes of Aging in Racial and Ethnic Minorities 110
V. Psychological Processes of Aging in Racial and Ethnic Minorities 115
VI. Summary and Conclusions: Toward a Life-Span Perspective on Cultural, Racial, and Ethnic Influences on Aging 118
References 119

7. Gender Differences in Aging
Margaret Hellie Huyck
I. Approaches to the Study of Gender 124
II. Gender and Psychological Functioning 125
III. Models of Gender Differentiation 128
IV. Implications for Aging Research and Practice 130
References 130

Part Three Behavioral Processes in Aging

8. Electrophysiology and Aging

Patricia N. Prinz, Robert E. Dustman, and Rita Emmerson

- I. Electrophysiological Age Differences 135
- II. Theoretical Implications of Electrophysiological Changes in Aging 139
- III. Modulation of CNS Age Differences with Physical Fitness 144
- IV. Summary and Conclusions 144
- References 145

9. Vision and Hearing in Aging

James L. Fozard

- I. Introduction 150
- II. Vision 150
- III. Hearing 159
- IV. Summary and Conclusions 164
- References 166

10. Motivation, Human Aging, and Cognitive Performance

Donald H. Kausler

- I. Assessments of Intrinsic Motivation 172
- II. Age and Motivation-Performance Relationships 176
- III. Aging and Models of Motivation 178
- IV. Summary 179
- References 180

11. Motor Performance and Aging

Waneen W. Spirduso and Priscilla Gilliam MacRae

- I. Work Capacity 184
- II. Muscular Strength 186
- III. Muscular Endurance 187
- IV. Upper Limits of Performance 188
- V. Conclusion 196
- References 197

12. Aging and Information-Processing Rate

John Cerella

- I. Introduction 201
- II. Aging in a Neural Network 202
- III. Latency as a Function of Age 203
- IV. Latency as a Function of Task 207
- V. Contrary Views 212
- VI. Recapitulation 215
- VII. The Theoretical Gain 217
- VIII. Conclusions 218
- References 219

13. Aging and Attentional Processes

Joan M. McDowd and James E. Birren

- I. Definitions 222
- II. Aging and Attention 223
- III. New Directions in Research on Aging and Attention 229
- IV. Conclusions 229
- References 230

14. Mammalian Models of Learning, Memory, and Aging

Diana S. Woodruff-Pak

- I. Animal Models in Gerontology 235
- II. Mammalian Models of Learning and Memory in Normal Aging 237
- III. Summary and Conclusions 251
- References 251

15. Learning and Memory in Aging

David F. Hultsch and Roger A. Dixon

- I. Differential Decline in Memory Systems 259
- II. Memory for Meaningful Materials and Events 261
- III. Experience and Plasticity of Memory 264
- IV. Individual Differences in Learning and Memory in Aging 266
- V. Conclusion 268
- References 269

16. Interactions between Memory and Language in Old Age

Leah L. Light

- I. Language Comprehension and Memory in Old Age 275
- II. Memory and Language Comprehension in Old Age 281
- References 285

17. Intellectual Development in Adulthood

K. Warner Schaie

- I. Introduction 291
- II. Methodological Issues 293
- III. Patterns of Intellectual Aging 295
- IV. Factors that Affect Intellectual Aging 299
- V. Practical Intelligence 300
- VI. Interventions in Adult Intellectual Development 302
- VII. Conclusions: Future Directions for Research on Intellectual Aging 303
- References 304

18. Cognitive Competence and Expertise in Aging

Timothy A. Salthouse

- I. Differences in the Type of Cognition 311
- II. Differential Representativeness of Individuals or Observations 312
- III. Different Standards of Evaluation 313
- IV. Differential Amounts of Experience 314
- V. Summary 318
- References 318

Contents

19. Creativity and Wisdom in Aging

Dean Keith Simonton

- I. Introduction 320
- II. Creativity 321
- III. Wisdom 324
- IV. Integration 325
- V. Conclusions 326
- References 327

20. Personality and Aging

Nathan Kogan

- I. Introduction 330
- II. Trait Models 331
- III. Contextual Models 337
- IV. Developmental Stage Models 339
- V. Summary and Conclusions 341
- References 343

21. Psychosocial Factors and Effective Cognitive Functioning in Adulthood

Carmi Schooler

- I. Introduction 347
- II. Relevant Findings of Different Disciplines 348
- III. Self-Direction and Cognitive Functioning 352
- IV. Remedial Possibilities 355
- V. Conclusion 355
- References 356

22. Psychopathology and Mental Health in the Mature and Elderly Adult

Gene D. Cohen

- I. Mental Health in Later Life 359
- II. Symptoms Signaling Possible Mental Disorder in the Elderly 359
- III. Atypical Presentations of Mental Disorder in the Elderly 361
- IV. Research Opportunities and Controversies 362
- V. The Epidemiology of Mental Illness in the Elderly 363
- VI. Interactions between Mental and Physical Health Phenomena in Aging 364
- VII. Brain and Behavior Interactions Influencing Mental Health and Illness 366
- VIII. Conclusion: Understanding and Treating Mental Disorders in the Elderly 368
- References 368

Part Four

Applications to the Individual and Society

23. Psychological Intervention with the Aging Individual

Michael A. Smyer, Steven H. Zarit, and Sara H. Qualls

- I. Introduction 375
- II. Principles of Research and Evaluation of Psychological Intervention 376
- III. The Service Array: Types of Intervention for Older Adults 381
- IV. Professional and Policy Issues 391

V. Conclusions	393
References	394
24. Caregiving Families	
<i>Margaret Gatz, Vern L. Bengtson, and Mindy J. Blum</i>	
I. Aging Families	405
II. Involvement of the Family in Caregiving	407
III. Interventions to Aid Family Caregivers	418
IV. Conclusion	421
References	422
25. Psychological Assessment of the Aging Individual	
<i>Alfred W. Kaszniak</i>	
I. Introduction	427
II. Neuropsychological Assessment	428
III. Functional Psychometric Assessment	430
IV. Critical Issues in the Psychological Assessment of Older Adults	431
V. Assessing Complaints of Memory Difficulty	434
VI. Conclusions and Future Directions	438
References	439
26. Human Factors and Design for Older Adults	
<i>Neil Charness and Elizabeth A. Bosman</i>	
I. Human Factors and Age	446
II. The Older Information Processor	447
III. Designing the Visual and Auditory Environment	449
IV. Anthropometry	453
V. Design for the Home	457
VI. The Design of Microcomputer Systems	457
VII. Conclusions	460
References	460
27. The Design of Special Environments for the Aged	
<i>Patricia A. Parmelee and M. Powell Lawton</i>	
I. Autonomy versus Security	465
II. Special Types of Environments: Autonomy and Security	471
III. The Social Environments of Residential Types	474
IV. How Can Empirical Research Accommodate the Complexity of Person–Environment Relations?	476
V. Conclusion	482
References	483
28. Ethical Issues in Gerontological Research and Services	
<i>Douglas C. Kimmel and Harry R. Moody</i>	
I. Ethical Issues in Psychological Research on Aging	490
II. Ethical Issues in Psychological Services for the Aged	496
III. Conclusion	499
References	500
Author Index	503
Subject Index	531

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Foreword

The present volume is one of three Handbooks now in their third edition: *Handbook of the Biology of Aging*; *Handbook of the Psychology of Aging*; and *Handbook of Aging and the Social Sciences*. Because of the growth in research on aging, there has been an accelerated need to collate and interpret existing information. Thus, the decision was made to accelerate the publication of the third edition of these handbooks to reflect this expansion in research.

The growth of the National Institute on Aging and sponsorship of research by the National Institute of Mental Health and the Administration on Aging has stimulated needed research. Phenomena of aging cut across many scientific fields. It is impossible to represent all of the material that is relevant in one volume. We focus on three major sources of influence on aging: the biological, the psychological, and the social. Perhaps in a strict sense, one should view aging as an ecological phenomenon dependent upon the influences of genetics, physical and social environments, and individual behavior.

It is hoped that these volumes will be consulted across scientific areas to trace some of the pathways of aging through the matrix of scientific information and disciplinary orientation. It is expected that sci-

entific personnel, graduate students, and professionals will find the volumes useful. The availability of the information in the convenient form of the handbooks also may stimulate new courses of instruction and seminars on aging as well as provide easy access to the research literature.

The series editor wishes to thank the editors of the individual volumes, Robert H. Binstock, Linda K. George, John W. Rowe, K. Warner Schaie, Edward L. Schneider, and the associate editors, Caleb E. Finch, Margaret Gatz, Victor W. Marshall, George M. Martin, Edward J. Masoro, George C. Myers, Timothy A. Salthouse, Carmi Schooler, and James H. Schulz. The series editor is grateful to these editors for their cooperation in the successful completion of this publication adventure. Thanks are owed to Donna E. Deuchman for developing the plan for the third edition and coordinating the relationship with the publisher.

There is little doubt from the reading of these volumes that the subject matter of aging has become more sophisticated and also mainstream in many scientific disciplines. It is hoped that the handbooks' publication will motivate continued attention to research on aging and the well-being of the elderly in our society.

James E. Birren

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Preface

The purpose of this handbook is to provide an authoritative review and reference source for the scientific and professional literature on the psychology of adult development and aging. It is designed to serve as a definitive reference source for graduate students, researchers, and professionals. The basic behavioral processes are covered in the volume to attempt to describe and explain changes in behavior and capacities that occur with advancing age as revealed in research. The explanations of the phenomena involve a wide range of factors, including biological influences, disease, and social influences such as generational differences and historical events. The chapters are intended to be comprehensive but do not necessarily review or refer to all publications on a specific point. In contrast to an annual review, the present chapters attempt to present a more systematic organization of information. Not only was the intention of this handbook to organize information in a convenient form, it is also designed to serve more systematic purposes and to focus on crucial theoretical or methodological problems.

The origin of the present third edition can be traced back to the *Handbook of Aging and the Individual*, published in 1959. Since then, the volume of published literature has dramatically expanded. The influence of the National Institute on Aging, the National Institute of Mental

Health, the Administration on Aging, as well as many foundations has encouraged the growth of an area of knowledge that in 1959 was pioneering in character.

Research on the psychology of aging continues to be in an expanding phase. Also, there is a marked change in the academic setting. Whereas once the psychology of aging was a marginal topic not commonly found in the repertoire of teaching and research in departments of psychology, it is now increasingly becoming mainstream. Some departments have more than one faculty member with specialties in the subject matter. New positions are opening in both the academic arenas and the applied areas. This bodes well for the future intellectual prosperity of the field.

While it is devoted primarily to the understanding of phenomena of aging, it is hoped that this volume will lead to an improvement in the conditions and quality of human life. The editors note with pleasure the collegial cooperation that was elicited in preparing this handbook. The production of this volume was accompanied by prime motivation, high cooperation, and high academic standards.

Along with the fact that the psychology of aging has come to be a mainline concern in psychology departments, there has been a shift toward more theoretically oriented research. In the pioneering stage of the psychology of aging, there were many

"look-and-see" investigations that helped to map out the territory. We now seem to be shifting into a phase when crucial experiments are wanted rather than descriptive ones. Thus, in the present chapters one finds more emphasis on systematic explanation.

Although the 1977 first edition of the present volume was comprehensive, the demand for space in the face of increasing publication costs now requires more selectivity. There are topics covered in the first and second editions but not represented in the present one because we felt that there had been insufficient progress since the previous handbook editions. For this reason, the reader is encouraged to consult the previous two editions for the treatments of particular topics.

Furthermore, there has been an editorial policy of enlisting new authors to prepare reviews on topics previously covered to get a turnover in perspective. Thus, the interested reader should consult previous editions to get alternative perspectives on material which is updated in the present volume. Not only does an improved perspective emerge, but an historical feeling will be experienced for shifting emphases in research.

In the second edition, two new parts were added to the handbook which dealt with "psychological applications to the individual" and "psychological applications to society." There were nine chapters written under this rubric which represented the outreach from the laboratory to society. This was done not only to point out the implications of research for application, but also to encourage the backflow of topics from "real life issues" to the laboratory. The editors believe that the intellectual prosperity of psychology depends upon the movement of information to and from basic research and application. In the current volume, there are fewer chapters in this area. But, one will note that there are fewer chapters in the book as

a whole since there is continuing pressure to make the volume manageable in size. One adaptation to the pressures was to create chapters which are both full length and half length in character. This has no relationship to a presumed importance of a topic. It is intended to reflect the extent of recent research activity in the particular area.

The editors wish to thank the associate editors, Margaret Gatz, Timothy Salt-house, and Carmi Schooler, for their assistance in planning the book, selecting topics and authors, and spending hours in reviewing the chapters. Each chapter was read in its first and second draft by two persons. The editors also wish to thank the authors for their commitment to scholarship and producing the original drafts and final copies on schedule. We are pleased that this handbook was assembled and produced according to schedule.

The editors also wish to thank the editorial coordinator, Donna E. Deutchman, for her professional handling of the book and its obligations from its beginning. She coordinated the scheduling, nudged and urged the authors and editors to keep to the calendar, and she edited each chapter with care to reduce inadvertent errors and best express the authors' intentions. We also thank Alice Zeehandelaar for her patience and skill in ensuring that manuscripts, telephone messages, and correspondence did not go astray.

The psychology of aging is an area in which researchers and professionals have much to contribute to advances in knowledge gained through research, as well as to applications for enhancing the quality of life for millions of mature persons and for the well-being of our society. The contributors and editors trust that this edition as well as the previous ones will advance the organization of research, teaching of the subject matter of adult development and aging, and improvement of human services.

James E. Birren
K. Warner Schaie

Part One

Theory and Measurement in the
Psychology of Aging

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The Concepts, Models, and History of the Psychology of Aging

James E. Birren and Betty A. Birren

I. Introduction

The purpose of this chapter is to trace the origins of the study of the psychology of aging and its concepts, leading to a description of its present state. *Psychology* is described as the science of behavior. As this volume shows, this embraces a broad spectrum of subject matter such as sensation, perception, learning, memory, intellectual abilities, motivation, emotions, personality, attitudes, motor movements, and social relationships.

A simple definition of the psychology of aging is that it is the study of the changes in behavior that characteristically occur after young adulthood. A fuller definition of aging introduced the idea of typical changes with time: "Aging . . . refers to an orderly or regular transformation with time of representative organisms living under representative environments (Birren, 1988, p. 160). Excluded in this concept of aging are age-associated disease disorders such as Huntington's Chorea, and Alzheimer's and Parkinson's disease. Also excluded are such environmental effects

as starvation, exposure to a toxic environment, or war trauma. These produce atypical outcomes not experienced by most persons over the course of life. In an earlier handbook, Birren (1959b, p. 5) said, "In scientific discourse, the core meaning of aging implies a determinant chain of events occupying a significant part of the life span after maturity." Thus, a statement about the psychology of aging also involves a statement about time and directions usually shown in the organization of behavior. Imbedded in the concept of aging are the implications of such terms as *characteristic*, *typical patterns of change*, and *entrainment*. The latter refers to the coalescing of influences on behavior over time.

Aging implies something that is associated with chronological age but not identical with it. Aging is used both as a label for an independent variable to explain other phenomena and as a dependent variable that is explained by other processes. Because the term *aging* is often used in a global sense to refer to all interindividual age differences and intraindividual age

changes, it has been suggested that narrower concepts and dynamic terms be introduced, such as *senescencing* to refer to the biological processes of aging, *eldering* to refer to the social processes of aging, and *geronting* to refer to the psychological process of aging (Birren & Schroots, 1984). Future research on aging may lead to the use of terms such as these which refer to subsystems and which give direction to changes identified with aging.

It is worth noting that few researchers using the term *aging* have defined what they mean by it (Birren & Cunningham, 1985, p. 5). Part of the reluctance to define aging may be due to a contemporary emphasis on operational sophistication rather than on conceptual rigor or theory development. The reluctance to define aging may also be the result of the ambiguity that surrounds the introduction of *time* into a description of change. Investigators shy away from specifying how patterns of behavior become organized and change with time (Schroots, 1988; Schroots & Birren, this volume). For this reason, in the present volume a separate chapter on time has been introduced that may be helpful in making our discourse about aging more efficient.

II. Intellectual Roots of the Psychology of Aging

Psychology was heavily influenced by the expansion of science in the nineteenth century. The earlier success of physicists in stating general physical laws encouraged other scientists to look for causes and for the lawfulness of all phenomena, including our growing up and growing old. Toward the end of that century, universities were encouraging research and establishing departments and laboratories of psychology with great optimism and confidence in the value of the scientific method. Underlying these efforts was the confi-

dence that all phenomena are expressions of general or natural laws.

An influential figure in early nineteenth-century European science was the Belgian M. A. Quetelet. A mathematician and astronomer, he also investigated natural laws governing human development and aging. The data he reported covered such topics as birth rates, mortality trends by age, stature, weight, and strength, as well as the development of "moral and intellectual qualities of man." The first sentence in Quetelet's 1835 book (translated in 1842) reflects his scientific orientation: "Man is born, grows up, and dies, according to certain laws which have never been properly investigated, either as a whole or in the mode of their mutual reactions" (p. 1). This is followed by statements about his program for probing the regularity or lawfulness of human development and aging.

They have not determined the age at which his faculties reach their maximum or highest energy, nor the time when they commence to decline. Neither have they determined the relative value of his faculties at different epochs or periods of his life, nor the mode according to which they mutually influence each other, nor the modifying causes. In like manner, the progressive development of moral and intellectual man has scarcely occupied their attention; nor had they noted how the faculties of his are at every age influenced by those of the body, nor how his faculties mutually react. (Quetelet, 1835, p. 1)

Quetelet suggested that the laws of development and aging could be discerned by looking at collections of data so that one is not lead astray by "only individual peculiarities which are infinite" (p. 1). As a mathematician, he emphasized observations of many individuals that would lead to the characterization of "the average man" around whom observations are distributed.

Although the quest for laws of human development and aging was stimulated by

nineteenth-century science, many pre-scientific ideas are part of our culture. Gruman (1966) reviewed prescientific ideas (prior to 1800) about aging and identified three dominant themes: (1) mankind was once a perfect organism but fell from grace because of sin, (2) there is a group of people in a distant part of the world who have retained the secrets of immortality, and (3) there are healing waters in a remote area of the world in which one can bathe and be restored to youth and vigor. These myths persist in contemporary attitudes toward the use of magical elixirs and the search for immortality.

III. The Relations of General and Experimental Psychology to the Psychology of Aging

Although sharing common historical origins with general and experimental psychology, the psychology of aging has been slower to develop. Almost none of the histories of psychology mention the topic of adult development, aging, or gerontology (e.g., Flugel & West, 1964; Hearnshaw, 1964; Peters, 1962). This neglect may result from a perceived threat to the potency or explanatory power of traditional concepts or experimental studies by complex interactions that occur with time. Hall's 1922 book, *Senescence: The Second Half of Life*, has rarely been commented upon in subsequent books in general psychology. It also is worthy of note that William James (1902) discussed children's interests and other features of their behavior but drew no implications for adults. And, in his widely used text book, *Psychology* (1900), James did not mention the organization or reorganization of behavior over the life span.

Woodworth's 1938 comprehensive *Experimental Psychology* made numerous references to the behavior of children but

none to older adults. Similarly, Steven's 1951 *Handbook of Experimental Psychology* has several chapters on development, but none mentions data on middle aged or elderly persons. For example, the chapter by Carmichael on "ontogenetic development" reports studies of fetal development but includes no reference to data after very early life. Although historically they are inclusive terms, *ontogenetic* and *developmental* have come to refer to child development, leaving behavioral changes in the adult phase to be labeled by other terms, such as *aging*.

In the otherwise comprehensive analysis of psychology as a science edited by Koch in 1959, there is no mention of adult development and aging, and child development is only cursorily treated. This is surprising because 1959 was the same year the *Handbook of Aging and the Individual* (Birren, 1959a) was published showing that a substantial body of literature on behavioral processes and aging already existed.

The *Handbook of General Psychology* (Wolman, 1973) contains an introductory chapter by Royce on "the present situation in theoretical psychology" (Royce, 1973). It does not include anything of a developmental character in its discussion of theory. Developmental psychology is relegated to a category of "selected areas" that includes, among others, industrial psychology and experimental hypnosis. In this "catchall" section is a chapter by Buhler, Keith-Spiegel, and Thomas (1973). It includes references from the nineteenth century as well as articles on animal research and methods of studying behavior from the embryo through old age. This poses the question of why developmental psychology, child and adult, has not come to be regarded as part of general psychology. Psychology at present appears to be a huge area of homesteaders with clusters of settlers oblivious to the existence of others and with little desire to communicate.

Obviously until recently, psychology did not embrace the implications of aging as part of the broader science. Although the American Psychological Association established a division on Maturity and Old Age in 1946, it did not establish a journal on aging until 1985, almost 40 years after the founding of the *Journal of Gerontology*.

Because it evolved outside the traditional core of psychology, the psychology of adult development and aging may have had the advantage of avoiding some of its intellectual biases. One of the biases that persists is the separation of social and biological psychologies. Although psychology is both a biological and a social science, that is, behavior is organized as a result of both influences, psychology for the most part has departmentalized or continued to separate the biological and the social components of behavior and has tended to neglect their interactions. Unfortunately, this separation does not encourage the study of adult development and of aging in which changes in behavior result from biological and social influences as well as from their interactions.

IV. The Emergence of Developmental Psychology

There was a small stream of research on aging during the latter part of the nineteenth century (see Birren, 1961). For example, in 1884 Galton gathered behavioral data on 9,337 males and females aged 5 to 80 years, at a health exposition in London. To measure the degree of association of variables with age, he devised what is most likely the first index of correlation. By 1931 Walter Miles was able to publish a review on the psychology of aging in the *Proceedings of the National Academy of Science*, "Measures of Certain Human Abilities Throughout the Life Span," and in 1933 he followed it with a longer paper on life span changes.

Between 1900 and 1940 only a small amount of research was done on the adult phase of life span, although research on child development expanded rapidly. It is to the emergence of child development that we turn to look for some of the roots of current thought in the psychology of aging.

G. S. Hall had written *Adolescence* in 1904, a book about the child's transition to adulthood. In 1910, G. M. Whipple published a manual of mental and physical tests. In 1914, it was expanded to two volumes. Whipple described it as "a book of directions, compiled with special reference to the experimental study of school children in the laboratory or classroom" (Whipple, Part II, 1915, p. 79). The first of the two 1915 volumes listed over 500 references, of which 37% were published before 1900. By 1931 the field of child psychology was sufficiently developed to warrant a *Handbook of Child Psychology*. In his introduction, Carl Murchison observed: "The field of child psychology is almost as old as is the field of experimental psychology" (Murchison, 1931, p. ix).

The psychology of aging trailed child psychology by almost 50 years, and very few researchers or scholars gave much attention to the psychological issues of later life until after World War II. By contrast, there was already a Bureau of Child Study in the Chicago school system before 1900 that was reporting systematic investigations of psychological measurements of children.

It is easy to form an impression that during the heyday of expansion of research on child development following World War I, most psychologists came to regard the child as an *end product* rather than as part of an ongoing course of the human life span. Implicit, perhaps, was the idea that the organism reaches its highest form of development by late adolescence, and there is little substance of scientific interest afterward. When the APA's Division on Maturity and Old Age (later re-

named Division on Adult Development and Aging) was organized in 1946, many of its leaders believed that the Division of Developmental Psychology, which was concerned with children, would merge with it. This has not happened, and most investigators of the various phases of the life span appear to have at most only loose intellectual ties with each other.

For the most part, *developmental psychology*, scientifically and professionally has remained *child psychology*. However, a few early leaders in the study of child development did turn their attention to the psychology of aging later in their careers. Among these were G. S. Hall, Lewis Terman, Charlotte Bühler, Sidney Pressey, Irving Lorge, Harold E. Jones, and John E. Anderson. The latter two were early directors of institutes of child study founded in the 1920s. Sidney Pressey was the first psychologist to publish a book that dealt with developmental psychology covering the entire life span including "the adult and older years" (Pressey, 1939).

The assertive separation of psychology from philosophy in the early twentieth century was accompanied by an emphasis on experimental studies of learning. Contributing to this era were advances in classical conditioning, for example, Pavlov's studies, and later, the operant conditioning of behaviorists (B. F. Skinner). The "building block" of organized behavior was considered to be the conditioned response. It was as though many psychologists were convinced that by discovery of the principles of learning they would have a complete understanding of how behavior is organized. This influence was more dominant in child psychology than in the psychology of adults because the latter has matured more recently, in an intellectually more permissive atmosphere. Here the reminder is offered that learning by itself has never created a child nor an old person.

Behaviorism ruled out explanations in

terms of both covert mental and physiological functions. In his book on animal awareness, Griffin (1970) listed a series of concepts that fell into the behaviorists' disfavor. Among these were *attention* and *intention*. Attention most assuredly is a precondition for learning and cognition. It is of interest to note that the 1987 *Handbook of Physiology* contains a chapter on attention (Heilman, Watson, Valenstein, & Goldberg, 1987) that depends upon the concept *intention*, a term excluded by behaviorism from the repertory of psychology.

In his *History of Psychology*, Peters (1962) made the point that "behaviorism is to be criticized not simply for its restrictive and outworn conception of scientific method; it is also to be criticized for having a very naive and inadequate view of what constitutes behavior" (p. 703). Riegel (1978), with reference to behaviorism, pointed out that in its purview "only the outer conditions and movement became the object of study" (1978, p. 27). He further maintained that the traditions of experimental and social psychology led to the study "of the individual and the group in a developmental vacuum" and that both "were founded in synchronic or 'timeless' thinking" (1978, p. 23). *Synchronic* refers to a state of the organism at only one point in time in contrast to comparing the state at two or more points in time—*diachronic*. Given this historical background, it is not surprising that experimental psychologists were vague and uninterested in the directions of behavior.

The growth of sophisticated experimental methods within psychology seems to have been accompanied by a tacit conviction that good research methods equal good theory. One of the few psychologists who incorporated the issues of developmental psychology into general psychology was J. R. Kantor (1959). He attempted to develop what he called an *interbehavioral psychology* that related behavior

both to its biological and social antecedents. For example, he commented about early maturity and late life:

Developments during maturity consist primarily of augmentation of equipment through individual contacts with novel and various stimulus objects. The period of advancing age marks a recurring susceptibility to biological conditions, primarily of the devolutional sort. At the same time, psychological equipments are developed at the close influence of changes in the social, occupational, and economic life conditions. (Kantor, 1959, p. 167)

Kantor's view portrays a shifting nature of influences on behavior and suggests that he believed that biological influences are dominant in early childhood, decline in maturity, and then rise again in importance in later life.

V. Perspectives on Developmental Psychology

Although child psychology of the early twentieth century was questing for broad generalizations about development, psychology had another mission, to separate itself and show itself to be different from philosophy, its traditional university partner. This separation was brought about at the expense of emphasizing methods of collecting data and of minimizing theory. For example, Murchison's 1931 *Handbook of Child Psychology* has no section devoted to theory, nor is the term *theory* listed in the comprehensive subject index. Child psychology, itself, was obviously influenced by the *zeitgeist* to be methodologically sophisticated but theoretically limited.

In the 1931 *Handbook of Child Psychology*, John E. Anderson stated the case for rigor of method. "In the history of any science there can be discerned two trends, one consisting of the main body of fact and generalization, slowly but surely accumulated, which in the course of time becomes

welded into a substantial and integrated field of knowledge, and the other consisting of the methods and techniques by means of which problems are attacked." Further, "problems, techniques, and results cannot be sharply differentiated. A problem, however stated, does not become a scientific problem until a method of attack can be set up" (Anderson, 1931, p. 1). These statements demonstrate the traditional emphasis on defining psychological problems in terms of the methods of collecting data, *operationalism*. With such an emphasis, however, it is possible to blur the distinction between methods of collecting data, interpretations of the data, and the underlying questions being asked. A good theoretical question can encourage methodological development. However, as stated, the divorce of psychology from philosophy had the effect of encouraging operationalism.

A. The Concept of Development

The concept of development has received scrutiny by several psychologists leading to a listing several of its essential ideas: "1) the organism conceived as a living system; 2) time; 3) movement over time toward complexity of organization; 4) 'hierarchization,' or the comprehension of parts or part-systems into larger units or 'wholes'; and 5) an end state of organization which is maintained with some stability of self-regulation" (Harris, 1957, p. 3). Maier (1969) stated that development was originally a biological term having to do with physical growth and change in structure over time. However, he also said that in the psychological sense, "development relates to socio-psychological development. Development in this sense refers to an integration of constitutional and learned changes which make up an individual's ever-developing personality" (Maier, 1969, p. 3).

Salkind (1985) said, "we can think of development as a progressive series of changes that occurs in a predictable pat-

tern as a result of an interaction between biological and environmental factors." This statement does not distinguish changes that occur in early life from those that occur in late life. Development might be regarded as progressing up to a phase of maximum differentiation after which dedifferentiation begins to occur (Schmidt & Botwinick, 1989).

Development, as scientists have defined it, implies changes in the organization of behavior from simple to complex forms, from small to large repertoires of behaviors, from fixed ways of responding to demands and needs to large repertoires of behaviors that can be strategically chosen. This suggests that development ends at no specific time and that the organism may continue to differentiate behaviors long after physical maturity, and move toward increasing complexity with concurrent differentiation and dedifferentiation (Schroots, 1988).

B. Theories of Development

In 1967, A. L. Baldwin published *Theories of Child Development*. Included in his review were the ideas of Heider, Lewin, Piaget, Freud, Werner, and Parsons. Baldwin stated that there were six scientific theories of child development significant enough to discuss. He also discussed behaviorist or conditioning (S-R) theories. His conclusion after reviewing these theories in some detail was that they were found to have a "patch work quality. The six becoming concerned with different aspects of child development more than they are focused on different explanations of the same behavior" (Baldwin, 1967). He added that the field of child development is in part a theory of behavior and action and in part a theory of change in behavior. This is relevant to the view in this chapter that the state of current theory in the psychology of aging, which borrows from existing islands of psychology, consists essentially of statements about how different aspects of behavior are organized, and

avoids theoretical statements about how behavior changes over time.

Development theories fall into several general types: (1) Maturational theories that emphasize biological unfolding of the organism with sequences of behavior explained in terms of the evolved genetic pattern of the species, the genome. (2) Social-personality theories that involve the development of the individual personality and its early formation in family relationships and later peer influences. (3) The development of behavioral controls over instincts that is the subject matter of psychoanalytic theory. (4) Behaviorism, which emphasizes learning and assumes that the nervous system begins as a *tabula rasa* for which learning determines the organization of behavior. And (5) the development of cognition that involves the emergence of a sequence of stages that provides a basis for differentiation and increasing complexity. In this latter theoretical explanation, the organism plays an active role in the outcomes of events, in contrast to a passive role in behaviorism.

To the preceding theoretical orientations another might be added, (6) the ecological orientation in which the behavioral tendencies of an organism result from the biological background of the organism and its interactions with a particular environment (Bronfenbrenner, 1977).

An organismic-ecological model appears to be a potentially useful perspective for understanding adult behavior. Baldwin said, "the Lewinian conceptualization of the differences between the children and adults is one of the few such descriptions that occur in the literature of child psychology" (Baldwin, 1967, p. 583).

In Baldwin's view, only Werner and Lewin were interested in the nature of development itself as opposed to the changes in specific aspects of behavior. With regard to Lewin, he said, "only Lewin gave even passing attention to the nature of the developmental process and

he also adopted differentiation as a primary developmental concept" (Baldwin, 1967, p. 585). Baldwin noted that even the terms most commonly used in psychology, such as *stimulus* and *response*, avoid the implication that there is an organism that is active and mediating the environment and behavior.

Baldwin's summary of developmental theories was somewhat optimistic: "In retrospect, the theories do not turn out badly. In many ways they support each other, and in total, suggest a kind of proto-theory of child development which, although obviously incomplete, badly defined, and surely wrong in some respects is a feasible and workable basis for further research and for more refined theory building" (Baldwin, 1967, p. 599). However, this suggests that students of aging need to recognize that they cannot depend upon "hand-me-up" theories of child development to organize information about adult life.

An important contribution to concepts about development has come from dialectical psychology (Riegel, 1978). Salkind (1985) discussed the impact that dialectical thinking has had upon developmental psychology, in which the result of crises is viewed as releasing positive and negative forces leading to developmental progression. He noted that there are four categories of developmental progression: (1) inner-biological, (2) individual-psychological, (3) cultural-psychological, and (4) outer-physical (Salkind, 1985, p. 243). Generally, these are the same categories involved in adult transformations, although perhaps the relative contributions of these influences shift with age. For example, in later life, health and disease probably exercise a greater influence on behavior than they do in the developing child or young adult.

One difference in concepts of aging compared with concepts in child development is the impact of contemporary neuroscience. Early theories of child de-

velopment appeared before there was much known of the physiology and biochemistry of the human brain. We now suspect that there may be as many as 50 different neurotransmitters in the brain and that behavior is modulated by many of them. It seems unlikely that any future theory of aging can fail to take into account concepts derived from the growth of the neurosciences. This is not meant to imply an exclusive biological determination of aging but to say that the pattern of behavioral changes seen in adults is influenced by a wide range of factors, including the structure and function of the brain itself, which was little known in the early days of psychology.

VI. The Emergence of a Psychology of Aging

As previously noted, one of the earliest books on the psychology of aging was G. S. Hall's *Senescence: The Second Half of Life*, published in 1922. His book is a rather complete review of what was then known about aging, including writings from biological sciences, social sciences, and general literature. The 518 pages of his book are essentially a description of the empirical "forest" of aging, psychological, biological, physiological, medical, historical, literary, and behavioral. Hall clearly provided a developmental point of view in the foreword: "It is hoped that the data here garnered and the views propounded may help to a better and more correct understanding of the nature and functions of old age, and also be a psychologist's contribution to the long-desired, but long-delayed science of gerontology" (Hall, 1922, p. v.).

On a poetic note, Hall suggested that there is a clarity of the mind in late life, "an 'Indian Summer' that should be both expected and utilized to the utmost for this is a precious bud of vast potentialities. . . . It brings a new poise and a